PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| Applicant's or agent's file reference | **FOR FURTHER ACTION** | see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. |
|---|---|---|
| C 452 | | |
| International application No. | International filing date *(day/month/year)* | (Earliest) Priority Date *(day/month/year)* |
| PCT/ZA 00/ 00137 | 18/08/2000 | 18/08/1999 |
| Applicant | | |
| TERBLANCHE, Hendrik, Lukas | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 3b

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

# INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 00/00137

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60N2/427

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B60N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | US 3 589 466 A (DUDLEY WALTER E)<br>29 June 1971 (1971-06-29)<br>column 1, line 48 -column 2, line 37;<br>figures 1-6 | 1-8 |
| X | DE 43 37 019 A (LEGENSTEIN WALTER WILLY<br>;SCHOPF WALTER DIPL ING (DE))<br>4 May 1995 (1995-05-04)<br>column 3, line 49 -column 5, line 8;<br>figures 1-6 | 1-8 |
| X | FR 2 159 104 A (BERUTTI GIORGIO)<br>15 June 1973 (1973-06-15)<br>page 2, line 13 -page 3, line 38; figures<br>1-3 | 1-7 |

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 22 November 2000 | 30/11/2000 |

| Name and mailing address of the ISA | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31–70) 340–2040, Tx. 31 651 epo nl,<br>Fax: (+31–70) 340–3016 | Gatti, C |

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication,where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | DE 23 46 757 A (OPITZ ALFONS)<br>27 March 1975 (1975-03-27)<br>page 1 -page 12; figures 1-5 | 1-5 |
| X | US 4 085 963 A (BULLERDIECK HEINZ H)<br>25 April 1978 (1978-04-25)<br>column 6, line 36 -column 8, line 38;<br>figures 1-7 | 1-4 |
| X | DE 20 16 701 A (RECARO GMBH & CO)<br>28 October 1971 (1971-10-28)<br>page 7 -page 15; figures 1-10 | 1-4 |
| X | US 5 605 372 A (AL-ABDULLATEEF ABDULGHAFOUR)<br>25 February 1997 (1997-02-25)<br>column 2, line 19 -column 3, line 30;<br>figures 1-3 | 1-4 |
| X | FR 2 596 338 A (SANTINI JEAN JACQUES)<br>2 October 1987 (1987-10-02)<br>abstract; figures 1-4 | 1-5 |
| X | WO 98 25789 A (STARFLEX AB)<br>18 June 1998 (1998-06-18)<br>abstract; figures 1,2 | 1-4 |

2

# INTERNATIONAL SEARCH REPORT

[redacted]ation on patent family members

Inter[redacted]al Application No
PC[redacted]A 00/00137

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| | | NO 992570 A | 27-07-1999 |
| | | SE 9604529 A | 10-06-1998 |

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**Published:**
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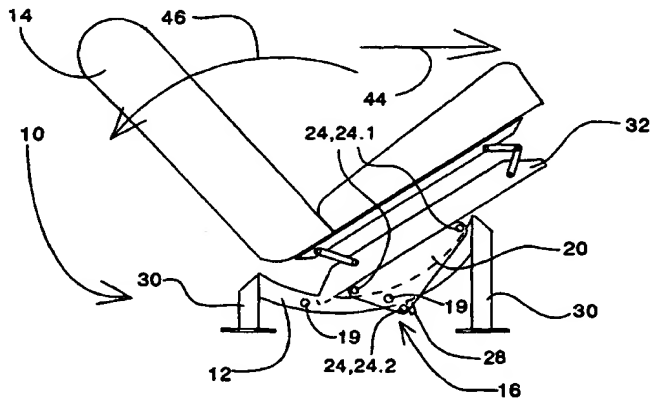
*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: VEHICLE RAPID DECELERATION RELATED INJURY-COUNTERACTING EQUIPMENT




(57) Abstract: A vehicle securable attachment (10) via which a vehicle seat is attached to a vehicle to render it rearwardly swivellable in the case of rapid vehicular deceleration comprises a pair of rails (12) along which a vehicle seat (14) is moveable up to a position of stoppage by being fitted to each rail via a carrier arrangement (16) providing runners (20) engaging rollably to the rails (12). The runners (20) are maintained in the position of normal seating by means of a shear pin (18) passing along registering apertures (19) in the runners (20) and the rails (12). The stoppage position of each runner (20) along its rail (12) is formed by a stopper pin (28). The rails (12) extend between legs (30) used for operatively bolting or otherwise securing the attachment (10) to the floor of a vehicle. Operative location of the attachment (10) involves its anchoring via conventional seat to vehicle body anchoring means. The seat (14) is securely fitted via its base engaging support (32) to the runners (20). Once a vehicle fitted with the adapted seat (14) is subject to rapid deceleration force, the shear pin is sheared resulting in the rapid forward movement of the carrier arrangement (16) and seat (14) assembly. The arcuate shape of the rails (12) simultaneously causes the seat to swivel in the direction of arrow (44).

WO 01/12464 A1

## (1) TITLE OF THE INVENTION

Vehicle rapid deceleration related injury-counteracting equipment

## (2) BACKGROUND TO THE INVENTION

Vehicle accidents often involve the rapid deceleration of a vehicle. In the case of a car or the like the situation is often encountered in head on collisions but not necessarily limited thereto. In the case aircraft an emergency landing has the same effect. Whether or not such rapid deceleration is the result of an accident involving condition the person or persons travelling along are under such circumstances often exposed to a potentially bodily injuring situation even if not causing external injuries. This can result from the whiplash effect caused by such rapid deceleration even if a seat belt is worn. Where the person(s) involved are the occupants of the front seat of a car, a head on collision often causes the steering wheel and dashboard of the car to become pushed into the seating position of the occupants of the front seats resulting in serious bodily injury to such occupants.

## (3) FIELD OF THE INVENTION

This invention relates to vehicle rapid deceleration related injury-counteracting equipment used in reducing vehicular travelling exposure to injury resulting from rapid vehicular deceleration. Although not so limited the invention finds useful application in re-adjusting the seating position in a vehicle for some or other reason being subject to rapid deceleration to counteract the possibility of an occupant becoming injured by such occurrence.

## (4) PRIOR ART DESCRIPTION

Injury resulting from rapid deceleration is conventionally counteracted by way of safety belts as worn by the occupants of seats. A very useful recent development is the fitting of rapidly inflatable bags to especially cars to rapidly form a cushion between the occupant of a front seat and car equipment such as the steering wheel in the case of an accident. While the equipment described contribute substantially to reducing the possibility of bodily injury

further equipment that can independently or in supplementing the already known equipment contribute to reducing bodily injury can only make a contribution to safeguard driving conditions.

## (5) BRIEF DESCRIPTION OF THE DRAWING

The invention is now described, by way of example, with reference to the accompanying drawings. In the drawings

Figure 1 shows in side elevation one embodiment of vehicle rapid deceleration related injury-counteracting equipment in the form of a vehicle securable attachment via which a vehicle seat becomes attached to a vehicle in a way that renders it rearwardly swivellable in the case of sudden vehicular deceleration for limiting the possibility of injury to the occupant of a seat,

Figure 2 shows one side of the attachment of figure 1 in sectioned end view along section line A-A in figure 1(a),

Figure 3 shows the attachment of figures 1 and 2 as operatively installed and fitted with a seat,

Figure 4 shows in side elevation another embodiment of the attachment as operatively installed and fitted with a seat,

Figure 5 shows in side elevation yet another embodiment of the attachment as operatively installed and fitted with a seat, and

Figure 6 shows one side of the attachment of figure 5 in sectioned end view along section line B-B in figure 5(b).

## (6) DETAILED DESCRIPTION OF THE DRAWINGS

Referring to the drawings vehicle rapid deceleration related injury-counteracting equipment in the form of a vehicle securable attachment, according to the invention, via which a vehicle seat is attached to a vehicle to render it rearwardly swivellable in the case of rapid vehicular deceleration, is generally indicated by reference numeral 10.

The attachment 10 comprises arcuately extending path defining means mountable to cause its leading end to extend upward once the attachment 10 is operatively fitted, in the form of a pair of arcuately formed rails 12 along which traveller holding position defining means in the form of a conventional vehicle seat 14 is moveable up to a position of stoppage by being fitted to each rail via a carrier arrangement generally indicated by reference numeral 16 and as discussed in more detail below, and a locking facility releasably securing the carrier arrangement 16 to each of the rails 12 in a normal seating position as shown in figures 3(a), 4(a) and 5(a).

Referring to figures 1 to 4, the carrier arrangement 16 provides runners 20 engaging rollably to the rails 12. As more clearly seen in figure 2, each runner 20 is in the form of a saddle-like rail engaging formation 22 fitted with cylindrical rollers 24 spaced to define a rail engaging path 26 there along, as shown in figure 1, that promotes proper engagement of the runners 20 to their rails 12. To this effect and referring to figures 1 to 3 each runner 20 is fitted with two overhead rollers 24.1 defining the upper boundary of the rail engaging path 26, as shown in figure 1, and a bottom roller 24.2 forming the lower boundary. Where the lengths of the rails 12 are required to be short, as shown in figure 4 and as perhaps necessitated by the location of fitting of the attachment 10 to the body of a vehicle, resulting in the leading ends 20.1 of the runners 20 leaving their rails 12 once caused to move into their seat tilting conditions, as shown in figure 4(b), the runners 20 make provision for an adequate number of rollers 24 to maintain their firm engagement to the rails 12. This is the case even if the leading ends of the runners 20 travel beyond the leading ends of the rails 12 once in their seat tilting conditions. As shown in figure 4 the runners 20 are in such case fitted with three or even more overhead rollers 24.1 to maintain a firm but easily displaceable fit between the runners 20 and their rails 12.

As shown in figure 2 the rails 12 present rectangular profiles each of an outline size matching with the shape of the rail engaging path 26 defined along the rollers 24 and the legs of the saddle formation 22.

The runners 20 are maintained in the position of normal seating as shown in figure 3(a) and 4(a) by means of the locking facility provided by a shear pin 18 passing along registering apertures 19 in the runners 20 and the rails 12. The force required to shear the pins 18 on deceleration of a vehicle fitted with the attachment 10 in turn carrying a seat 14 is pre-established to ensure that such shearing will only occur under emergency conditions involving rapid vehicular deceleration. The stoppage position of each runner 20 along its rail 12 is formed by a stopper pin 28 extending below the bottom race of each rail 12. Displacement of the runners 20 is thus terminated on their bottom rollers 24.2 coming into abutment with the appropriate pins 28. The pins 28 are naturally adequately strongly secured to the rails 12 to enable them to positively stop the seat 14 once occupied and fitted to the runners 20 when the attachment 10 is operatively fitted to a vehicle that becomes subject to an adequately rapid decelerating force to have caused the release of the runners 20 from their shear pins 18.

The rails 12 extend between legs 30 used for operatively bolting or otherwise securing the attachment 10 to the floor of a vehicle. Operative location of the attachment 10 involves its anchoring via conventional seat to vehicle body anchoring means. As shown in figures 3 and 4 the seat 14 is securely fitted via its base engaging support 32 providing the seat engaging base, to the runners 20. When the attachment 10 is used to supplement an existing vehicle seat the latter is thus simply released from is anchoring location and fitted to the runners 20 via its support 32 once the attachment 10 is anchored via the conventional seat anchoring means to the vehicle.

Referring to figures 5 and 6 and in another embodiment the attachment 10 is configured to be inter-spaced between the upper bed 14.1 of the seat 14 and it base engaging support 34. The carrier arrangement 16 is provided by roller wheels 36 that are rollably fitted alongside a seat attachment support 38 by way of connecting arms 39 also serving as runner shafts. The wheels 36 engage curtain rail fashion with the rails 12. The rails 12 are secured to rail carriers 40 in turn secured by means of brackets 41 to the base engaging support 34.

Stoppage of the wheels 36 along the rails 12 are caused by the leading end 12.2 of each rail 12 being closed off. The wheels 36 are locked to their rails 12 in the conventional seat upright position by locking facilities such as rail stops ahead of the wheels 36 (not shown) permitting wheel release by passing over the stops in response to the exertion of the appropriate forward force on the attachment 10 by the seat 14 as occupied on deceleration of the vehicle modified by means of the attachment 10.

The seat 14 of the figure 5 embodiment is directly fitted to the support 38 with the leading ends of the rails 12 entering the upper bed 14.1 of the seat 14 when the latter is in its normal use condition, as shown in figure 5(a). Fitting of the attachment 10 of the figure 5 embodiment to a standard vehicle seat involves separating the upper bed 16.1 of the seat from its base engaging support 34 and securing the latter and the upper bed 14.1 to opposite sides of the rail carrier 40.

In use and referring to all the drawings the seat 14 of a vehicle fitted with an attachment 10 in under normal use conditions in the position shown in figures 3(a), 4(a) and 5(a). Under these circumstances the seat 14 is locked towards the trailing ends of the rails 12 by means of the locking facilities such as the shear pins 18.

Once a vehicle fitted with the adapted seat 14 is subject to rapid deceleration, the seat 14, as appropriately occupied, is urged forward. A force is thus exerted on the positions of locking between the carrier arrangement 16 as carrying the occupied seat 16 and the rails 20, whether by way of the shear pin 18 or otherwise, depending on the locking configuration between the seat 14 and the rails 12. When this force exceeds a magnitude that has been pre-established the locking effect is broken resulting in the rapid forward movement of the carrier arrangement 16 and seat 14 assembly. In the case of the figures 3 and 4 embodiments breaking of the locking effect between the carrier 16 and the rails 12 involves the shearing of the pins 18.

Once the seat 14 is released it commences rapid travelling along its rails 12 in the direction of arrow 44 as shown figures 3(b), 4(b) and 5 (b). The arcuate shape of the rails 12 simultaneously cause the seat 14 to swivel backward in the direction of arrow 46 during forward progression. It will be appreciated that the forward travelling of the seat 14 and the

simultaneous backward swivelling occur substantially instantaneously owing to the magnitude of the force exerted by the deceleration while the carrier arrangement 16 and seat 14 assembly move forward under their momentum. The carrier arrangement 16 thus travels up to the position of stoppage in which the seat 14 is situated in the position as shown in figures 3(b), 4(b) and 5(b). The occupant as wearing a conventional safety belt (not shown in the drawings) to hold such person to the seat at least when a vehicle is subject to rapid deceleration is thus tilted to lie backward. It will be appreciated that the safety belt must be anchored in such a way to the seat that it does not obstruct the backward swivelling action.

The backward tilting of the occupant of the seat 14 has the advantageous effect of reducing the whiplash that is associated with very rapid deceleration of a vehicle as the occupant is swivelled away from the normal upright sitting position. Where the sudden deceleration involves a head on crash, that is often the situation when such deceleration occurs, fixed vehicle equipment such as a steering wheel and a dashboard are often forced into the seating position of the front seats. The rearward tilting in such case has the additional beneficial effect of removing the occupant out of the line of inward displacement of such equipment. A further benefit in the case of a car crash is that the legs and feet of a user are withdrawn from the floor pedal area thus preventing their becoming tangled amongst this equipment during such crash. Although not shown the equipment can be supplemented by a rapid inflation bag in the region of the pedals that promotes the release and cushioning of the feet and legs of the occupant involved and that is activated on the carrier arrangement 16 reaching its frontmost position once released.

It will be appreciated that the force required to cause the release of the carrier arrangement 16 into travelling forward and becoming swivelled must be suitably pre-established to prevent a release under circumstances where vehicle control is still exertable. In the case of a car or the like different release forces may even be applied for the driver and other passengers so that the driver can in the appropriate case still maintain control while the passengers are swivelled backward.

It will further be appreciated that the invention finds application under all conditions where rapid deceleration can injure a person exposed thereto. It is not only limited to motorised land vehicles involved in accidents.

## (7) CLAIMS

(1) Vehicle rapid deceleration related injury-counteracting equipment used in reducing vehicular travelling exposure to injury resulting from rapid vehicular deceleration comprising

path defining means extending suitably and in the direction of travelling along a vehicle, at least once the equipment is operatively fitted if not integrally forming part of a vehicle, along the path of which means defining a traveller holding position is constrained to be displaced even if via a carrier arrangement and at least once the equipment is ready for use, that causes the traveller holding position defining means, once displaceably held if requiring fitting to the path defining means while not necessarily forming part of the equipment, to become re-adjusted into a position of reduced exposure to injury of an occupant of the holding position defining means on moving towards the leading end of the path, and

a locking facility by means of which the traveller holding position defining means is at least indirectly releasably locked to the path defining means at least once the traveller holding position defining means is operatively fitted to the path defining means if not forming a permanent feature thereof, for permitting its release at the latest in response to a pre-established rate of deceleration established with the traveller holding position defining means under conditions of load, the equipment, once in use, thus causing the traveller holding position defining means to become released at the appropriate rate of vehicular deceleration if not already subject to earlier release, resulting in its forward motion under its inertia along the path up to a position of stoppage, as provided along the path defining means, during which forward motion the traveller holding position defining means becomes re-adjusted into the position of reduced exposure to injury of an occupant.

(2) Equipment as claimed in claim 1 that makes provision for involving a traveller holding position defining means in the form of a seat re-adjustably held by performing a rearward swivelling action during forward travelling along the path once the equipment is in use, the equipment when so in use thus causing the seat to perform a rearward tilting action on progressing towards the leading end of the path that is of adequate extent to cause an occupant of the seat to become rearwardly tilted during vehicular deceleration to the extent

of at least reducing the whiplash effect owing to such occupant becoming swivelled away from a conventional upright seating position and, in the appropriate case, of reducing the exposure of such occupant to vehicular equipment moving towards the seat under accident occurring conditions.

(3) Equipment as claimed in claim 2 in which at least the leading end of the path defining means extends along an upwardly extending curve of adequate radius, once the equipment is operatively installed if not integrally forming part of a vehicle, to result in the desired progressive backward tilting of the seat on moving along the curved portion of the path in progressing towards its leading end.

(4) Equipment as claimed in claim 3 in which at least the largest portion of the path defining means defines a path that extends appropriately arcuately, once the equipment is operatively installed if not integrally forming part of a vehicle, to cause the seat to commence its tilting action, once released, substantially on commencement of travelling from its locked position towards the leading end of the path.

(5) Equipment as claimed in claim 3 or claim 4 in which the path defining means is in the form of a railage layout making provision for causing the seat to rollably engage against release therewith even if via a carrier arrangement.

(6) Equipment as claimed in claim 5 in which the railage layout provides two adjacently spaced rails, installed if not integrally forming part of a vehicle, in adequately spaced relationship to result in each rail being located in opposite seat side edge-region co-acting relationship with the seat, as at least indirectly rollably engaging with the rails at least once the equipment is ready for use.

(7) Equipment as claimed in claim 6 that incorporates a carrier arrangement engaging rollably to the rails while the seat, not necessarily forming part of the equipment, is suitably secured to the carrier arrangement, at least once the equipment is ready for use, to result in the seat co-acting with the railage layout via the carrier arrangement.

(8) Equipment as claimed in claim 7 in which the carrier arrangement is in the form of a seat-engaging base fitted along opposite sides with rollers engaging with the rails.

(9) Equipment as claimed in claim 8 that comprises the carrier arrangement and the rails as engaged by the seat engaging base, as in the form of an attachment, that is interspaceable between a vehicle seat and its conventional support used for anchoring it to a support base to render such seat rearwardly tiltable once the attachment is operatively anchored and fitted with a seat.

(10) Equipment as claimed in claim 7 in which the carrier arrangement provides runners engaging rollably to the rails with the seat, not necessarily forming part of the equipment thus co-acting with the rails via the runners, at least once the equipment is installed for use if not integrally forming part of a vehicle.

(11) Equipment as claimed in claim 10 in which the locking facility is in the form of shear pins releasably locking the carrier arrangement to the rails towards their trailing ends at least once the equipment is operatively installed if not integrally forming part of a vehicle.

(12) Equipment as claimed in claim 10 or claim 11 in which each runner is in the form of a rail engaging formation defining a railage path along an adequate number of oppositely mounted upper and lower rollers to ensure a firm though smooth rollable engagement with its rail.

(13) Equipment as claimed in claim 12 that comprises the runners as engaging with the rails in the form of an attachment, that is firmly securable to a vehicular seat anchoring location while a seat is secured by its support base to a seat support position to render such seat rearwardly tiltable once the attachment is operatively anchored and fitted with a seat via its support base.

(14) Equipment as claimed in claim 13 that comprises the runners as engaging with the rails, as in the form of an attachment, that is firmly securable to a vehicular seat anchoring location while a conventional seat is securable by its support base to the runners of the

attachment to render such seat rearwardly tiltable once the attachment is operatively anchored and fitted with such seat.

(15) Equipment as claimed in any one of claims 10 to 14 in which each rail is fitted with a stopper pin defining the position of stoppage there along.

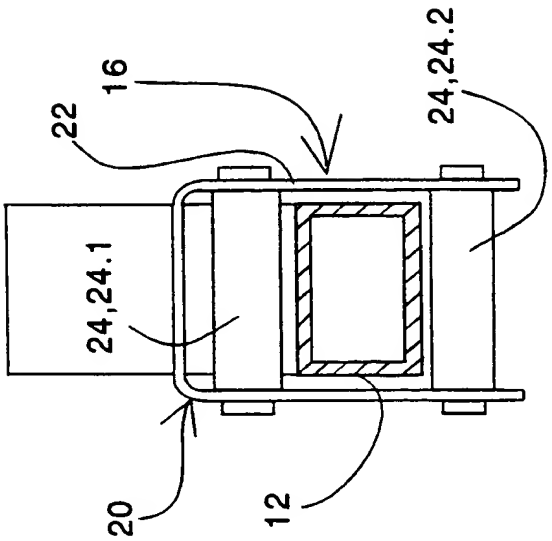



FIGURE 2

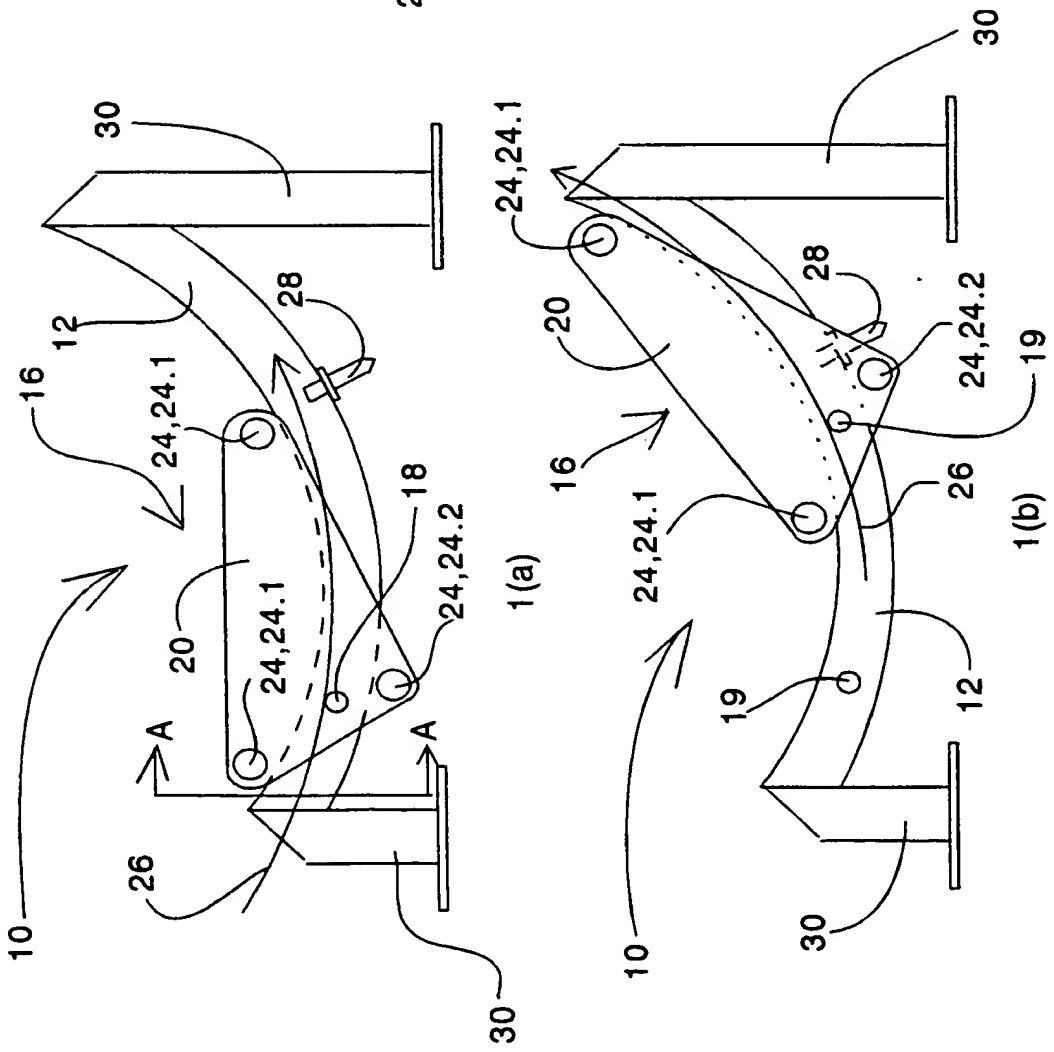
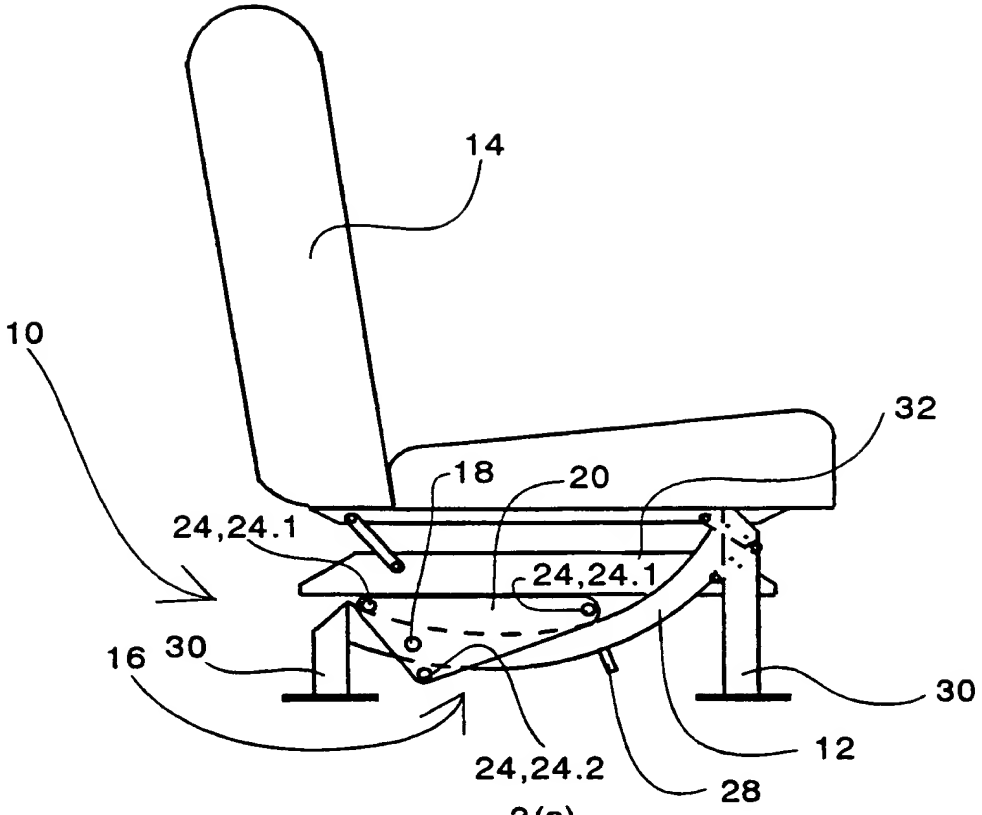
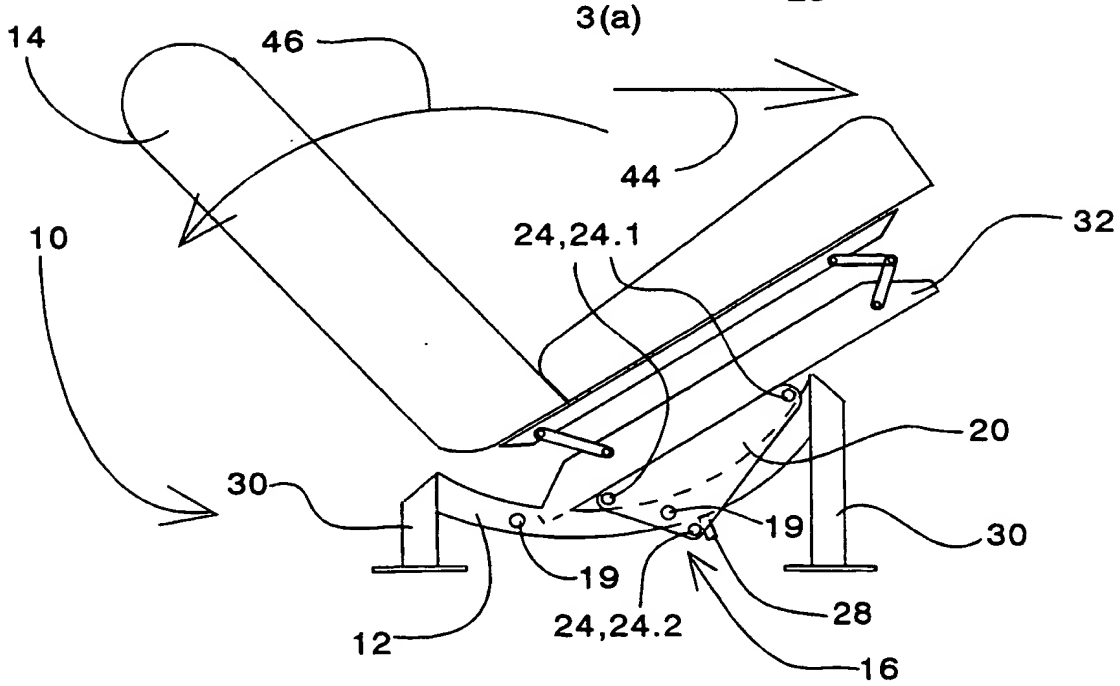



FIGURE 1

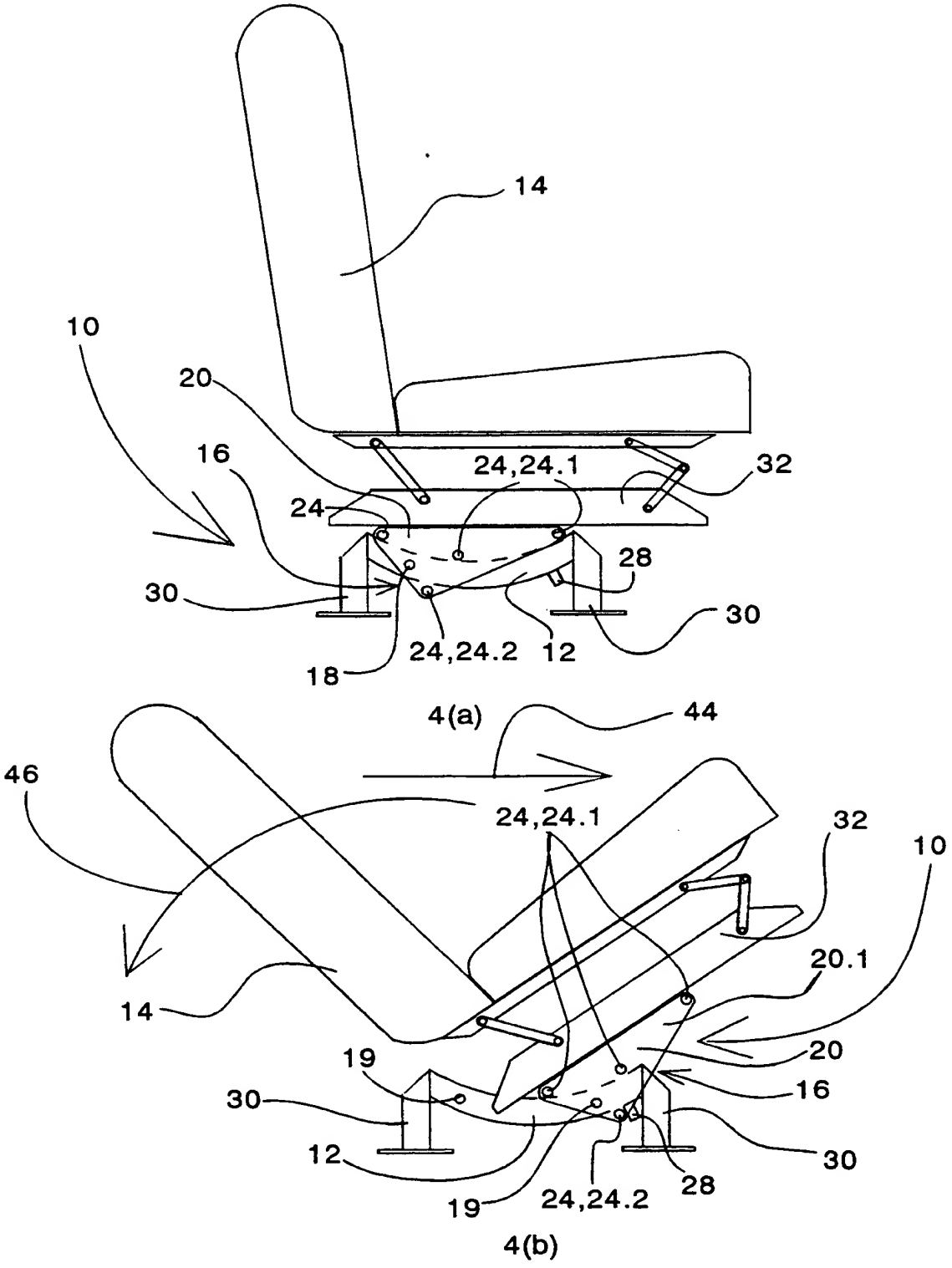



3(a)




3(b)

FIGURE 3


14
10
20
16
24,24.1
32
24
28
30
30
24,24.2
12
18
4(a)
44
46
24,24.1
32
10
20.1
14
20
19
16
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30
12
28
19
24,24.2
4(b)

FIGURE 4

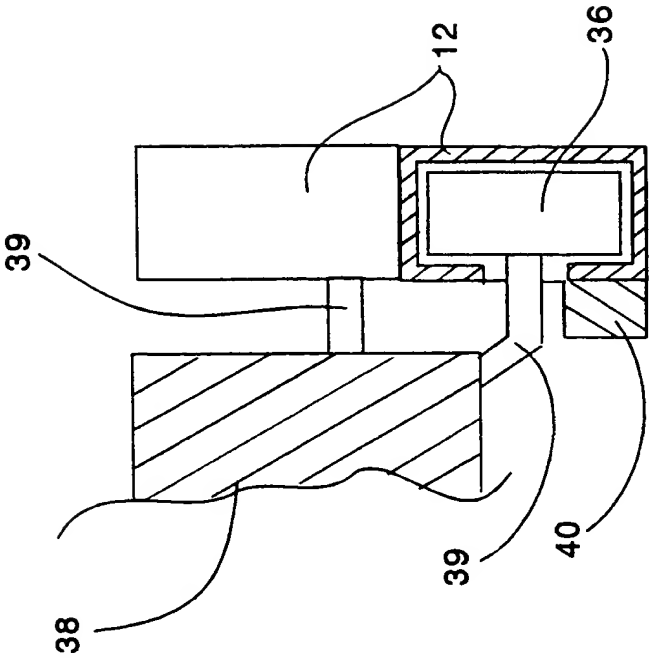
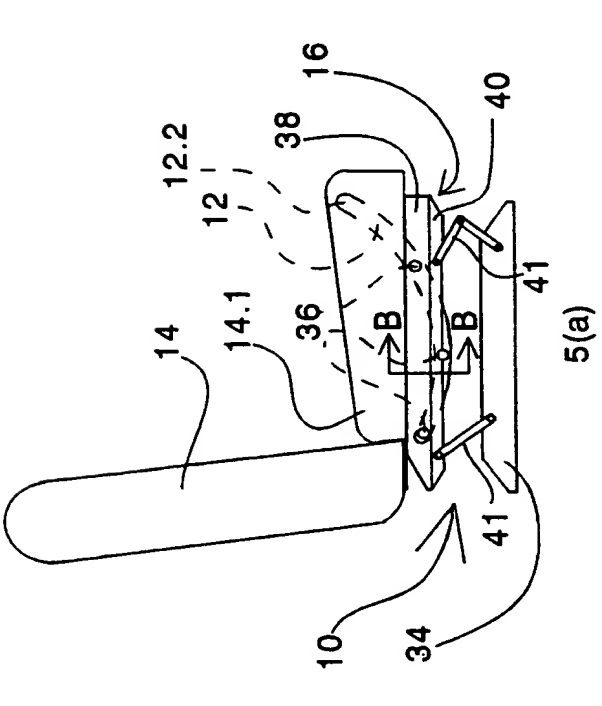
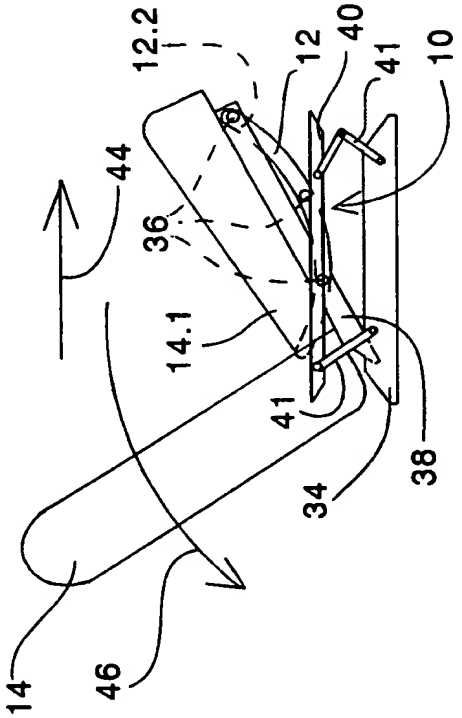



FIGURE 6




5(a)




5(b)

FIGURE 5

# INTERNATIONAL SEARCH REPORT

Intern Application No
PCT/ZA 00/00137

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60N2/427

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B60N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
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| X | DE 43 37 019 A (LEGENSTEIN WALTER WILLY<br>;SCHOPF WALTER DIPL ING (DE))<br>4 May 1995 (1995-05-04)<br>column 3, line 49 -column 5, line 8;<br>figures 1-6 | 1-8 |
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 22 November 2000 | 30/11/2000 |

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| European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Gatti, C |

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Intern[redacted] Application No
PCT/ZA 00/00137

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